

In his revision of that paper, published in the same work for November 1866, page 671, he places it as a synonym or subspecies of what he calls *Otaria falklandica*, which is my *Arctocephalus nigrescens*, and not the *Otaria falklandica* of Shaw nor the *Otaria falklandica* of Burmeister as Dr. Peters supposes, as I have shown above. In this paper he removes *Otaria falklandica* (that is, *nigrescens*) from the subgenus *Phocartos*, to which he referred it in his first paper, and places it in his subgenus *Arctophoca*.

I have not seen the skull; but I believe, from the figure, that this alteration is a mistake. The figure of the skull of his *Otaria Philippii* has no resemblance to the skull of my *Otaria nigrescens*. It is more nearly allied to the skull of *Otaria Stelleri* from California, agreeing with it in having a vacant space with a pit in the bone between the fourth and fifth upper grinders on each side, looking as if a grinder had fallen out and the cavity had been filled up.

The subgenus *Arctophoca* of Dr. Peters's first essay, not as modified in his second one to contain *O. falklandica* (*nigrescens*), chiefly differs from Gill's genus *Eumetopias*, which was formed on my description and figure of the skull of *Otaria Stelleri* (or *californiana*), in the fifth upper grinder not being so far back, but in a line with the back edge of the orbital process of the zygomatic arch, instead of far behind it as it is in *Eumetopias*.

XVIII.—On the Occurrence of *Diplommatina Huttoni* and *Ennea bicolor* in the West Indies. By WILLIAM T. BLANFORD, F.G.S., C.M.Z.S.

IN the 'Annals and Magazine of Natural History' for August 1867, Mr. R. J. Lechmere Guppy described the occurrence in Trinidad of *Diplommatina Huttoni*, Pfr., and suggested that its presence and that of *Ennea bicolor*, Hutton, might be accounted for by supposing both to have migrated across the Tertiary Atlantis. I cannot help thinking that there are several circumstances opposed to this view; and in order to explain them it is necessary to describe the distribution of *Diplommatina Huttoni* and *Ennea bicolor* in India.

Diplommatina Huttoni has hitherto only been found on the lower slopes of a portion of the Western Himalayas, near Masúri. It is true that the Himalayas have not been explored to a sufficient extent to justify the assertion that the shell does not exist elsewhere; but, as not a single Western Himalayan *Diplommatina* has as yet been found in those parts of the Eastern Himalayas about Darjiling which have been comparatively well explored, nor, *vice versâ*, a solitary Darjiling species in the Western Himalayas, it is extremely improbable

that the range of *D. Huttoni* extends more than, at the outside, 200 or 300 miles along the base of the mountains. In the plains of India no *Diplommatina* has ever yet been found*. In the hills of Southern India, forms differing entirely from those of the Himalayas alone occur. The negative evidence, therefore, against the existence of *D. Huttoni*, or of any other Indian species of the genus, over any large area of country is overwhelming. And this is entirely in accordance, as has been remarked by Mr. Benson, with the general facts of the distribution of operculated land-shells in India, none being met with over so large an area as species of the non-operculated forms frequently are.

To the west of Hindustan not a single *Diplommatina*, or land-shell allied to *Diplommatina*, has ever been recorded. The genus and its allies are utterly unknown in Western Asia, Europe, and Africa. Not only are the Diplommatinidæ absent, but all their allies, the Cyclophoridæ, are equally so, with the exception of two or three obscure species in South Africa and of the anomalous genus *Craspedopoma* in the Azores, Madeira, and Canary Islands; and these few forms have at least as close an affinity to American types as to those of India.

To the east and south-east of India the case is different. Species of *Diplommatina*, many of them sinistral, and of allied genera have been found in Burma, Labuan (*Opisthostoma De-Crespignii*), the Philippine Islands (*Arinia*), the Moluccas, the Pelew Islands (*Palaina*), the New Hebrides, New Caledonia, Lord Howe's Island, Australia, and New Zealand. A species is said to occur also in the Sandwich Islands. Now, as *Megalomastoma* and *Cyclophorus* are common to the mainland of India, the Malay archipelago, and the West Indies, it appears by no means improbable that *Diplommatina* may have the same distribution; and certainly, if *D. Huttoni* ever migrated or was transported by natural causes from India to America, I cannot help thinking that it most probably traversed countries inhabited by its relations. But I cannot help doubting its having migrated at all over any extensive area.

Ennea bicolor is a shell of much wider distribution. It is met with throughout the whole peninsula of Hindustan, and it also occurs in Burma. It lives in the plains, in cultivated land as well as in waste.

It is easy to conceive that a mollusk with such habits might

* I know of but one, doubtful exception—doubtful inasmuch as I do not know at what elevation the shell was found. This was in South Canara, on the Malabar coast. The form was one of the type peculiar to the hills of Southern India. The whole fauna of the coast of Malabar is peculiar.

be very probably transported with living plants, or with roots or seeds. Mr. Guppy doubts whether the animals would survive the voyage from the East to the West Indies. Of this there can, I think, be no question. Mr. Benson, if I am not mistaken, has had specimens of *Diplommatina* alive in England; and there are very few Indian shells which, when aëstivating, will not bear a journey of several months without injury, provided damp or excessive cold be avoided.

That the introduction of a single pair of shells is ample for the diffusion of the species has been proved in Calcutta in the case of *Achatina fulica*. The facts are well known, but will bear repeating. About twenty-five years ago, two specimens were brought from Mauritius, and placed in a garden. Now the species abounds almost everywhere throughout an area of at least five miles in length. In many places several hundreds might be collected. Ten years ago, to my own knowledge, the shell was quite unknown in the Botanical Gardens on the opposite bank of the Hoogly. The other day I saw it living there in abundance. Of course, in a large city like Calcutta, where plants are constantly transferred from one garden to another at a distance, great facilities for dispersion exist; but the numbers, all unquestionably derived from a single pair in the course of so short a time, are nevertheless astonishing. I have very little doubt that one impregnated female would suffice equally well to introduce a species.

Another fact in favour of *Diplommatina Huttoni* and *Ennea bicolor* having been introduced into the West Indies by man is, that both are very small shells, precisely such as would most easily escape notice and be transported with plants. No shell is more likely than the *Ennea* to have been thus carried into foreign countries. The case of the *Diplommatina* is certainly far more difficult, but still it appears to me to present fewer difficulties than the theory of migration. Is there a botanical garden in Trinidad?

If the *Diplommatina* has not been transported artificially, I should be almost inclined to suspect that the Trinidad species is not really identical with that inhabiting the Western Himalayas, but that two forms, closely resembling each other, have originated separately at the extreme limits of the area occupied by the genus.

With regard to the *Ennea*, I have very little doubt of its having been transported. Many of the cultivated plants of the West Indies must have been introduced by the Spaniards and Portuguese, some of them, in all probability, direct from India; and the date of the introduction may thus have been sufficiently distant to allow of a considerable amount of dispersion amongst the various islands.